

CLAIMS

What is claimed is:

- 1 1. A device comprising:
 - 2 a substrate, further including:
 - 3 a first major surface including a plurality of lands; and
 - 4 a second major surface;
 - 5 at least one component attached to at least some of the plurality of lands on
 - 6 the first major surface, the at least one spacer having a first height with respect to
 - 7 the first major surface; and
 - 8 at least one sacrificial component attached to the first major surface, the at
 - 9 least one sacrificial component having a second height with respect to the first
 - 10 major surface, the second height greater than the first height, the at least one
 - 11 sacrificial component further including a fuse.
- 1 2. The device of claim 1 wherein at least one sacrificial component includes
- 2 at least one solder contact.
- 1 3. The device of claim 1 wherein at least one sacrificial component includes
- 2 at least two solder contacts.
- 1 4. The device of claim 3 wherein the fuse is positioned between the at least
- 1 two solder contacts.
- 1 5. The device of claim 3 wherein the sacrificial component further
- 2 comprises a body, the body further comprising:
 - 3 a first body surface that includes the at least two solder contacts of the
 - 4 sacrificial component;
 - 5 a second body surface substantially parallel with the first body surface
 - 6 devoid of a conductor.

1 6. The device of claim 1 wherein the device includes a semiconductor.

1 7. The device of claim 1 wherein the device includes a ball grid array
2 semiconductor device.

1 8. The device of claim 1 wherein the at least one sacrificial component
2 further comprises:

3 a body; and

4 a C-shaped conductor including a portion of which is embedded within the
5 body.

1 9. The device of claim 8 wherein the C-shaped conductor includes a fuse,
2 wherein the fuse is molded within the at least one body of the sacrificial component.

1 10. The device of claim 8 wherein the body is an insulative material.

1 11. An assembly comprising:

2 a ball grid array device, further including:

3 a first major surface including an array of lands;

4 a second major surface; and

5 an array of solder balls attached to a first portion of the array of
6 lands;

7 at least one discrete component attached to a second portion of the
8 array of lands; and

9 at least one sacrificial component attached to a third portion of the
10 array of lands, the sacrificial component having a fuse therein.

1 12. The assembly of claim 11 wherein the at least one discrete component
2 has a first height, and the at least one sacrificial component has a second height
3 greater than the first height.

1 13. The assembly of claim 11 wherein the at least one non sacrificial
2 component is positioned to prevent the at least one discrete component from
3 impacting another surface.

1 14. The assembly of claim 11 further comprising a printed circuit board,
2 wherein the ball grid array device is attached to the printed circuit board, the at least
3 one sacrificial component is positioned with respect to the printed circuit board to
4 prevent the at least one discrete component from contacting the printed circuit
5 board.

1 15. The assembly of claim 11 further comprising a printed circuit board,
2 wherein the ball grid array device is attached to the printed circuit board, the printed
3 circuit board further comprising:
4 a ground plane; and
5 a power plane,
6 wherein the at least one non operational, sacrificial component is formed of an
7 insulative material and positioned with respect to the printed circuit board to prevent
8 the at least one discrete component from contacting the ground plane and the power
9 plane of the printed circuit board.

1 16. The assembly of claim 11 wherein the sacrificial component has a
2 surface positioned near the printed circuit board that is devoid of electrically
3 conductive material.

1 17. The assembly of claim 11 wherein the sacrificial component further
2 comprises:
3 a body;
4 a conductor molded within the body, the conductor formed to present two
5 contacts at a first body surface for attaching the contacts to a corresponding set of
6 lands on the ball grid array device, the conductor molded within the body so that the

7 body includes a second body surface positioned near the printed circuit board that is
8 devoid of electrically conductive material.

1 18. The assembly of claim 17 wherein the conductor is C-shaped, each of
2 the free ends of the C-shaped conductor completed to one of two contacts.

1 19. The device of claim 17 wherein the conductor includes a fuse.

1 20. The device of claim 17 wherein the conductor includes a fuse, and
2 wherein the fuse is molded within the body of the sacrificial component.

1 21. An assembly comprising:
2 a ball grid array device, further including:
3 a first major surface including an array of lands;
4 a second major surface; and
5 an array of solder balls attached to a first portion of the array of
6 lands;
7 at least one discrete component attached to a second portion of the array of
8 lands; and
9 a plurality of non operational, sacrificial components attached to a third
10 portion of the array of lands.

1 22. The assembly of claim 21 wherein the plurality of non operational,
2 sacrificial components attached to a third portion of the array of lands includes at
3 least three non operational, sacrificial components.

1 23. The assembly of claim 22 wherein the plurality of non operational,
2 sacrificial components attached to a third portion of the array of lands pads have
3 substantially the same height.

1 24. The assembly of claim 22 wherein the least one discrete component has
2 a first height, and the plurality of non operational, sacrificial components attached to
3 a third portion of the array of lands pads have a second height that is greater than the
4 first height.

1 25. The assembly of claim 21 wherein the plurality of non operational,
2 sacrificial components attached to a third portion of the array of lands each have a
3 surface positioned away from the array of lands to which the plurality of sacrificial
4 components are attached which is devoid of a conductive material.

1 26. The assembly of claim 21 wherein the plurality of non operational,
2 sacrificial components attached to a third portion of the array of lands include a
3 fuse.

1 27. The assembly of claim 21 further comprising a printed circuit board, the
2 ball grid array assembly attached to the printed circuit board.

1 28. A method comprising:
2 electrically connecting at least one discrete component to a land side of a
3 substrate;
4 forming solder balls on the land side of a substrate; and
5 attaching at least one non operational, sacrificial component to the land side
6 of the substrate.

1 29. The method of claim 28 wherein attaching the at least one non
2 operations sacrificial component to the land side of the substrate includes placing
3 the non operational, sacrificial component so as to prevent the discrete component
4 electrically connected to the land side of the substrate from contacting another
5 surface.

1 30. The method of claim 28 further comprising providing a fuse within the
2 non operational, sacrificial component.

1 31. The method of claim 30 further comprising molding material around a
2 fuse.